EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-02

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-D-14-031	10/01/2014 To 09/30/2017 Base Option Period Number 2	Climate Change Sectoral Impact

Contractor: INDUSTRIAL ECONOMICS, INCORPORATED

Specify Section and paragraph of Contract SOW:

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2016 To 09/30/2017

Comments:
THE PURPOSE OF THIS ACTION IS TO INITIATE WA 2-02 "CLIMATE CHANGE SECTORAL IMPACTS MODELING AND TECHNICAL SUPPORT" WITH AN INITIAL LOE OF 200 HOURS FOR START UP WORK. ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED. THIS WORK DOES NOT DUPLICATE ANY WORK PREVIOUSLY PERFORMED UNDER MY AUTHORITY.

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee:	LOE:
Contract Period: 10/01/2014 To 09/30/2017		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

Contractor WP Dated:	Cost/Fee	LOE:
Cumulative Approved:	Cost/Fee	LOE:

Work Assignment Manager Name: Jeremy Martinich (Signature) (Date)	Branch/Mail Code: Phone Number: 202-343-9871 FAX Number:
Project Officer Name: Lorraine Reddick (Signature) (Date)	Branch/Mail Code: Phone Number: 202-564-1293 FAX Number:
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Natalia Fisher-Jackson NATALIA FISHER-JACKSON Digitally signed by NATALIA FISHER-JACKSON DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=NATALIA FISHER-JACKSON, dnQualifier=0000016076 Date: 2016.09.29 08:32:23 -04'00' (Signature) (Date)	Branch/Mail Code: Phone Number: 919-541-3564 FAX Number:

WORK ASSIGNMENT

Title: Climate Change Sectoral Impacts Modeling and Technical Support

Work Assignment Manager/COR: Jeremy Martinich
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STATEMENT OF WORK
Climate Change Sectoral Impacts Modeling and Technical Support

I. INTRODUCTION

The Climate Change Division (CCD) in the U.S. EPA's Office of Air and Radiation works to assess and address global climate change and the associated risks to human health and the environment. The CCD plays a key role in United States and international efforts to address climate change by:

- Implementing successful voluntary programs to reduce non-carbon dioxide (CO2) emissions;
- Analyzing rigorously CO_2 and non-CO_2 greenhouse gas (GHG) emissions and economically efficient mitigation and adaptation options;
- Communicating climate analyses and strategies to policy-makers, experts and U.S. climate negotiators;
- Building effective international capacity to analyze and reduce GHG emissions and associated air pollution; and
- Educating the public on climate change.

CCD also has experience in assessing climate change vulnerability and integrating information on climate science, impacts, and adaptation into broader analytical frameworks.

This Statement of Work (SOW) supports EPA in implementing several activities that are required to fulfill the mission of the CCD.

II. BACKGROUND

Understanding the risks of the physical impacts and economic damages associated with different levels of future climate change is essential to informing policy decisions designed to address these risks. The Climate Change Impacts and Risk Analysis (CIRA) project is an on-going project to estimate the benefits of GHG mitigation, and to complement the well-developed capacity to model the costs of climate policies. This effort focuses on assessing the degree to which global GHG mitigation may avoid or reduce climate change-related risks and damages in the U.S. compared to a future without mitigation policy. To achieve this goal, CIRA estimates climate change impacts and damages, including changes in risks associated with key sources of uncertainty, for multiple sectors in the U.S. under a reference future and multiple global GHG emissions mitigation scenarios. This multi-model framework, whose findings were summarized in a recent EPA report (www.epa.gov/cira), enables development of consistent estimates of the benefits of climate change policy across these multiple impacts sectors.

The purpose of this work assignment is to provide CCD with support to further implement the CIRA project, including the completion of several technical analyses, review of results summaries, and providing general CIRA program support through quick turnaround requests.

III. TASKS

The Contractor shall perform the work described below in the following four tasks.

Task 0. Develop Workplan and Project Management

The Contactor shall provide a workplan outlining the approach, resources, timeline, and estimated costs for all tasks listed below. Estimates of costs and hours shall be presented by professional level and month. The Work Assignment Manager (WAM) will review the workplan and will request revisions and or changes as needed. If necessary, the Contractor shall incorporate EPA comments into the final workplan.

The Contractor shall provide project management under this task. During the period of performance, the Contractor shall immediately inform the WAM and CO by telephone and/or email of any problems that may impede performance along with any corrective actions needed by the EPA or the Contractor to solve the problem.

Under this task, the Contractor shall also attend a kick-off meeting via conference call to discuss the goals and strategy for completing future deliverables on a schedule to be determined. This kick-off meeting will serve as a discussion to clarify the EPA's requirements, solicit ideas and feedback from the Contractor, as well as formulate ideas for work to be completed by the Contractor under the Tasks listed below. The Contractor will also participate in one or more wrap-up discussions at the end of the period of performance, or when the necessary support has been completed, to discuss work completed under the tasks below.

Deliverable	Due Date
Task 0.1: Participate in kick-off meeting	Within 5 business days of work assignment issuance.
Task 0.2: Workplan and cost estimate to EPA	Within 20 days after receipt of this work assignment.
Task 0.3: Monthly status report	By 10th business day each month, or another agreed upon date with the COR.
Task 0.4: Participate in wrap-up discussion	Due dates for these discussion will be outlined in technical direction.

Task 1. Complete Technical Corrections and Additions to Components of CIRA2.0 Modeling

Under Work Assignment #1-02 of this Contract, the Contractor supported EPA in running a large number of sectoral impact models under the CIRA2.0 framework. As follow-on to Work Assignment #1-02, the purpose of this task is to conduct additional technical analysis and

corrections to enhance several of the sectoral components. The Contractor shall perform the following subtasks:

Subtask A: Water Quality Completion
The Contractor shall provide computational support to conduct the simulations of the water quality analysis. In addition, the Contractor shall conduct additional processing and review of water quality impacts modeling to support the models being used in the CIRA2.0 analysis for this sector. This work involves the review and evaluation of baseline and projected water quality parameter values, as well as indices and sub-indices involved in the calculation of water quality index scores. The results of this processing and review should be included in the forthcoming CIRA2.0 technical report and journal manuscript (being supported under a separate contract vehicle).

Subtask B: Completion of Electricity Supply and Thermo-Cooling Manuscript
Under Work Assignment #1-02, EPA, NREL staff, and the Contractor conducted an analysis of climate change impacts on electricity supply with the explicit consideration of how changes in hydrogenation and thermo-cooling water availability could affect dispatch and supply. The purpose of this task is to provide Contractor support in developing a manuscript describing this analysis for submission to a peer-reviewed journal. This work shall be conducted in close coordination with the COR and NREL staff. The Contractor shall be prepared to revise the manuscript based on reviews received from the journal's referees, and provide for open-access publication.

Subtask C: Extreme Temperature Mortality Acclimatization Sensitivity Analysis
Under Work Assignment #1-02, the Contractor simulated changes in extreme temperature mortality using the CIRA2.0 framework of scenarios and climate projections. The purpose of this subtask is to conduct an acclimatization analysis similar to the one conducted under CIRA1.0 and included in the 2015 CIRA report. This sensitivity analysis is designed to provide a sense, even if overly optimistic, of how projected temperature mortality could change under a scenario where the physiological response of individuals in all modeled cities is consistent with the most acclimatized populations. The Contractor shall provide an updated spreadsheet of results to the COR.

Subtask D: Redo Component of Freshwater Recreational Fishing Economic Analysis
Under Work Assignment #1-02, the Contractor simulated changes in freshwater recreational fishing using the CIRA2.0 framework of scenarios and climate projections. The purpose of this subtask is to redo the economic analysis using proportional changes in suitable habitat acreages for the different fish guilds instead of absolutes. These ratios can then be applied to the baseline acreages used in the economic model, which are based on a separate estimate of acreages per hydrologic unit code. The Contractor shall provide the updated spreadsheet of results to the COR.

Subtask E: Enhancement of Bridge Infrastructure Analysis
Under Work Assignment #1-02, the Contractor simulated climate change effects on bridge scour and the potential repair costs necessary to maintain service levels. In close coordination with the COR, the Contractor shall modify the analytic approach to develop a more robust characterization of proactive and reaction adaptation, as well as the consideration of the use of new flood return

interval calculations being developed under the CIRA2.0 project. Unless mutually agreed upon by the Contractor's technical modeling team and the COR, other components of the original bridge approach shall remain the same to ensure consistent with the underlying peer-reviewed literature. Upon technical direction from the COR, the Contractor shall perform the analysis using the updated methodology and provide and updated spreadsheet of results to the COR. In addition, the Contractor shall provide a brief written summary of the technical methods which differ from those used in the original CIRA bridges study.

Deliverable	**Due Date**
Task 1.1: Completed and quality-checked water quality simulation results (Subtask A)	No later than November 1st, 2016
Task 1.2: Completed manuscript for submission to peer-reviewed journal. (Subtask B)	No later than November 1st, 2016
Task 1.3: Updated extreme temperature mortality spreadsheet that includes the acclimatization sensitivity analysis. (Subtask C)	No later than November 15th, 2016
Task 1.4: Updated freshwater recreational fishing results spreadsheet. (Subtask D)	No later than November 15th, 2016
Task 1.5: Updated bridge infrastructure results spreadsheet and methods summary. (Subtask E)	No later than December 1st, 2016

Task 2. Provide Technical Review and Quality Checks of CIRA2.0 Technical Report Material

EPA and the Contractor are in the process of developing a technical report describing the findings of the CIRA2.0 modeling exercise, a document which will serve as input to the Fourth National Climate Assessment. In drafting this technical report, EPA and the Contractor are summarizing the sectoral results of a number of other modeling teams. To ensure information quality, the purpose of this task is to provide those modelers with the opportunity to review the summarized information to ensure that the estimates are correct and appropriately described. The modelers should be prepared to provide prompt reviews of the draft materials to ensure that the technical report's progress is not slowed.

Deliverable	**Due Date**
Task 2.1: Completed reviews of draft technical report sections.	No later than December 15th, 2016.

Task 3. Technical Support and Quick Turnaround Assistance

As the above tasks proceed, EPA is likely to require technical support and quick turnaround assistance related to the work outlined in this SOW. The Contractor shall be expected to perform five of these technical support tasks, each requiring approximately 40 hours of work. As requested per technical direction from the COR, the Contractor shall support EPA by:

- Providing background materials for presentations/briefings.
- Providing additional compilations of CIRA climate or sectoral impacts data for usage in other analyses.
- Paying open access publication fees for CIRA manuscripts.
- Small technical analysis related to the subjects of this work assignment.
- Drafting sectoral impacts summaries and communication products related to the CIRA report.

As stated above, this work will be initiated through technical direction, and these communications will include specific details regarding the work, including delivery dates.

Deliverable	**Due Date**
Task 3.1: Technical support deliverable as defined in technical direction from the COR.	Within 3 weeks of initial technical direction from the COR.

IV. PERIOD OF PERFORMANCE

The period of performance for this Work Assignment is from date of issuance to September 30th, 2017.